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October, 1922. The second number of the *Journal*, published in May, is about double the size of the first number and is entirely devoted to papers on relativity.

That interest in the applications of mathematics to commercial and professional work has been further stimulated in France by the war is evidenced by the number of recent books dealing with such subjects. For example, one lesser publisher (Dunod, Quai des Grands-Augustins 47 et 49, Paris) alone lists, among others, recent books with the following titles: *La culture générale des jeunes gens se destinant à l'industrie; Les mathématiques de l'élève ingénieur,* Part I (1920); *Effets gyroscopiques et méthodes vectorielles* (1920); *Les mathématiques de l'ouvrier moderne,* 2 volumes; *Trigonometrie rectiligne* (1920); *Dessin industriel. Cours pratique de projections* (1919); *Traité de dessin géométrique* (1919); *Cours de comptabilité* (1920); *Notions sommaires de comptabilité industrielle* (1920), *Cours élémentaire de méchanique industrielle* (three volumes, 1919–1920); *Comptabilité commerciale* (two volumes, 1918–1920); *Les calculs commerciaux et financiers* (in press). Few of these would be of practical service in this country and for this reason no mention of author, paging, or prices need be made.

ARTICLES IN CURRENT PERIODICALS.

ANNALI DELLE UNIVERSITÀ TOSCANE, new series, volume 4, fasc. 2, 1919: "Sulle curve piane algebriche che ammettono una curva data come prima polare" by G. Albanese, 33–41—Volume 5, fasc. 8, 1920: "Sulla moltiplicazione delle serie" by U. Dini, 253–274.

ISIS, volume 4, no. 1, 1921: "Different types of mathematical history" by G. A. Miller, 5–12; "Note on the Fahrenheit scale" by F. Cajori, 17–22; "Introduction to the history and philosophy of science (preliminary note)" by G. Sarton, 23–31; "The principle of symmetry and its applications to science and to art" by G. Sarton, 32–38 [Discussion of ideas of F. M. Jaeger, D'A. W. Thompson, T. A. Cook, J. Hambidge, D. W. Ross]; "*Encyclopédie des Sciences mathématiques pures et appliquées*" by G. Sarton, 39–40 [Protest against the slowness of this publication]; Reviews of: J. Ruska, "Zur ältesten arabischen Algebra und Rechenkunst" (*Sitzungsberichte der Heidelberger Akademie der Wissenschaften, Philosophisch-historische Klasse,* pp. 1–125, 1917) by L. C. Karpinski, 67–70; P. Boutroux, *Les Principes de l'Analyse Mathématique,* tome second (Paris, 1919) by J. M. Child, 96–107; L. E. Dickson, *History of the Theory of Numbers,* volume 2, by J. M. Child, 107–108; H. Wieleitner, *Geschichte der Mathematik* (II. Teil, II. Hälfte) by D. E. Smith, 109.

JOURNAL OF THE INDIAN MATHEMATICAL SOCIETY, volume 13, October, 1921: "Some pitfalls in the theory of groups" by G. A. Miller, 161–165—December: "On a certain theorem in geometry" by F. H. V. Gulasekharam, 210–218; "Mathematics in India, then and now" by V. Sankaran, 219–224 (to be continued) ["It is a characteristic of the present times in India that we feel as if we have been shut out from all knowledge of the glories of this ancient land in the palmy days of yore. The cry is now 'Look back into your past history and you will learn more than what you can by merely studying what you are taught in schools.' In every department of knowledge this looking back into the past is necessary. We have begun to realize how advanced our fore-fathers were in the study of the Humanities, Political and Social Sciences, Arts and Philosophy. It is therefore, but natural to expect that in other departments of knowledge also, they should have reached a tolerably high standard of advancement and efficiency."]; "Interference method in astronomy" by T. P. Bhaskara Sastri, 230–231.

JOURNAL DE MATHEMATIQUES PURES ET APPLIQUÉES, 8th series, volume 4, fasc. 4, 1921: Statement by C. Jordan (who has since died), on retiring from the active management of this Journal after 35 years of service; announcement of memoirs to be published in the near future, insert 1–4; "Integral solutions of the equation $\xi^2 + \eta^2 = \zeta^2$ in the quadratic realms of rationality" by H. Hancock, 327–341—9th series, volume 1, fasc. 1, 1922: "Camille Jordan," insert I–IV (see *1922,* 138).

MATHEMATICS TEACHER, volume 15, March, 1922: "The psychology of the equation" by E. L. Thorndike, 127–136; "Reaction vs. radicalism in the teaching of mathematics" by G. W.

Myers, 137–146; "The definition of similarity" by G. W. Evans, 147–151; "The place of elementary calculus in senior high school mathematics" by N. B. Rosenberger, 152–156; "Experimental geometry" by G. A. Harper, 157–163; "How can I bring the soul of mathematics to my pupils" by A. H. Huntington, 164–171; "Papers by pupils of the plane geometry classes of Fullerton Union High School" by Lena E. Reynold, 172–181; "Discussion" by L. F. Babcock and P. Huffman, Jr., 182–184; New books, 185–188; News and Notes, 189–190.

NATURE, volume 109, February 23, 1922: "The pioneer of non-euclidean geometry," 232–233 [Review of G. B. Halsted's *Girolamo Saccheri's "Euclides Vindicatus."*]—March 2: "The directive tendency of elongated bodies" by W. D. Lambert, 271–272; "Mathematics in Japan" by G. B. M(athews), 287–288—March 16: "Greek mathematics" by D'A. W. Thompson, 330–334 [Review of Heath's *History of Greek Mathematics*, Oxford, 1921. "Were this book only for the mathematician it would be no book for me; but it is a great deal more. It is for all who care for the historical aspect of science; it is for all lovers of Greek, for mathematics is a true 'Legacy of Greece,' and is interwoven through and through with Greek thought and philosophy. . . . There is a vast deal of information in Heath's book, clearly set forth and orderly arranged; we have nothing to compare with it in English, and Gino Loria's 'Scienze esatte' is its only serious rival abroad. I am inclined to think that Loria paints history with a broader brush, while Heath excels in his account of individual mathematicians; but I cannot help thinking that Heath, who has attained such complete and acknowledged success in his editions of Euclid and the rest, must have found that in this history he had struck a harder task than any he had tried before. We may know more of the history of mathematics than of any other science, but the lacunæ are immense, and tradition is poor material for the historian. Moreover the historical aspect is somewhat uncongenial to the mathematician, if only because (as Eva Sachs says) history deals with *das Werden*, and mathematics with *das Sein*! When Sir Thomas Heath deals with Euclid, Apollonius, Archimedes, Diophantus, Hero or Pappus, he gives us in a few pages all we could expect by way of epitome of the trend, the method and the results of their labours. But his book pursues its steady, instructive course with little digression, allusion or anecdote, and with curiously little bibliographical information such as he puts abundantly into his other books. Surely one of the objects of a text-book is to guide the student to what it does not and cannot contain! Some of us, I think, would have liked a little more digression or even gossip. . . . The simple fact is that Sir Thomas Heath has given us so much, and it is all so good, that he makes us ask for more."]—March 23: "The theory of relativity in relation to scientific method" by Dorothy Wrinch, 381–382 [Paper read before the Congress of Philosophy in Paris on December 29, 1921]—April 8: "Mathematical analysis" by G. H. Hardy, 435–438 [Review of Hobson's *Functions of a Real Variable*, volume 1, 2nd ed., (Cambridge, 1921); Carslaw's *Introduction to the Theory of Fourier's Series*, volume 1 (London, 1921); Edward's *Integral Calculus*, volume 1 (London, 1921)]; "Dr. G. B. Mathews" by W. E. H. B., 450–451—April 15: "The fourth dimension" by S. Brodetsky, 474–475 [Review of *The Fourth Dimension Simply Explained.* A Collection of Essays selected from those submitted in *The Scientific American's* Competition (New York, 1913, London, 1921)]; "Pythagoras's theorem as a repeating pattern" by P. A. MacMahon, 479—April 22: "Mathematics and public opinion" by G. B. M(athews), 520–521.

LA NATURE, volume 50_1, February 11, 1922: "L'Univers stellaire" by É. Belot, 87–91—March 18: "Le calendrier perpétuel vivant" by E. Singer, supplement 86–87.

OBSERVATORY, volume 45, March, 1922: "Meeting of the Royal Astronomical Society, February 10, 1922," 65–69 [Address of the President, A. S. Eddington, in presenting the gold medal of the society to J. H. Jeans]; "An eclipse of the moon as seen from the moon" by L. Richardson, 69–71 [Paper read at the meeting of the British Astronomical Association].

PERIODICO DI MATEMATICHE, series 4, volume 1, November, 1921: "Che cosa contiene la Géométrie di Cartesio?" by E. Bompiani, 313–325; "La prospettiva e lo sviluppo dell'idea dei punti all'infinito" by U. Cassina, 326–337; "Il teorema Descartes-Eulero relativo ai poliedri" by A. Maroni, 337–346; "La questione dei nove valori nella risoluzione della cubica" by C. Candido, 347–351; "Il concetto delle due divisioni nell'insegnamento elementare e normale" by G. Furlani, 351–354; "Polemica logico-matematica C. Burali-Forti e F. Enriques," 354–365—Volume 2, January, 1922: "Sui meccanismi articolati nelle costruzioni di Geometria elementare" by E. G. Togliatti, 41–49; "L'area di una superficie curva nella definizione di Minkowski e nell'insegnamento della Geometria elementare" by L. Brusotti, 49–55; "Una rapida visione geometrica del teorema fondamentale dell' Algebra" by O. Chisini, 55–59; "Sui massimi e minimi e sulla variazione di una funzione reale" by E. Maccaferri, 60–67; "Su la configurazione dei circoli dei nove punta dei triangoli determinati da un gruppo di punti situati su una medesima circonferenza" by D. Montesano, 68–70; "Einstein e l'interpretazione subiettiva della scienza," 77–80 [Address of F. Enriques to the public of Bologna on the occasion of the conference which Einstein held there in October, 1921]; "Atti della Società Italiana di Matematiche 'Mathesis,' Ottobre 1921," 90–116.

Popular Astronomy, volume 30, March, 1922: "Suggestions regarding gravitation" by W. H. Pickering, 155–156; "Note on the velocity of light" by H. Shapley, 192–193 [By an extremely delicate test of the relative velocity of light of different colors it is shown that blue and yellow light can travel through space for 40,000 years without a difference of more than one or two minutes, if indeed there is any difference whatever]—April: "Henrietta Swan Leavitt" by S. I. Bailey, 197–199 [With photograph. "Miss Leavitt graduated from Radcliffe College in 1892. Later she spent several years as advanced student and volunteer research assistant at the Harvard Observatory, in travel, and in teaching. She became a permanent member of the Observatory staff in 1902, and thereafter was closely associated for the remainder of her life with Prof. Pickering, in the solution of problems especially connected with the determination of the photographic magnitudes of stars. Beginning work as an ordinary assistant in the measurement of variable stars on photographic plates, by her exceptional ability and intense application she soon became the head of the department of photographic stellar photometry. . . . Miss Leavitt was of an especially quiet and retiring nature, and absorbed in her work to an unusual degree. She had the highest esteem of all her associates at the Harvard Observatory, where her loss is keenly felt."]; "Shall we accept relativity?" by W. H. Pickering, 199–203 ["Three years have now elapsed since the Principle of Relativity was first announced to a startled public, as perhaps the greatest scientific discovery since the time of Newton. Little attention had been paid to it before that, outside of the ranks of professional physicists. Now that the glamour has somewhat subsided, it may be a good time to take account of stock, to see what evidence has meanwhile accumulated in its favor, and how far its supporters have increased among scientific men. Regarding the latter, the physicists it is believed support it as before. Among the astronomers its stronghold is undoubtedly in England. In America opinion is divided. Which way the majority vote would be cast it is impossible to say. On the continent of Europe I have found the Latins generally skeptical, while I understand that very few of the Germans take it seriously at the present time. Three years is of course too brief a time for any important discovery to win universal acceptance in science. Perhaps a generation may be taken as a fair interval, sometimes a little less, sometimes a little more. Therefore if its adherents have not increased in the past three years, or have even fallen off, that can hardly be counted very seriously against it. Let us now see what evidence has accumulated with regard to it in the meantime. . . . Summarizing our conclusions, we may say that in the first test, . . . the theory of relativity fails to give results in accord with the facts. Regarding the second test, the only result so far obtained is that it has now been clearly and satisfactorily demonstrated what not to do. The evidence so far regarding the third test is as we all know, and have seen, distinctly adverse."]; "Cosmic clouds" by W. F. Rigge, 203–205; "How to know the heavens" by G. B. Chase, 210–213; "The duration of sunrise and sunset" by W. J. Fisher, 213–216; "A letter of John Kepler" by F. Cajori, 217–219; "Planetary configurations" by F. R. Honey, 219–222; "Effect of the sun-spots on the terrestrial temperature" by P. G. Searles, 222–225; "Hypothesis on the formation of new stars" by A. Verronet, 225–227 —May: "Eratosthenes—III" by W. H. Pickering, 257–262; "What about Mars?" by J. G. Porter, 268–271; "A suggestion regarding gravitation, II" by W. H. Pickering, 272; "'Astronomy improved'" by C. Rufus, 272–280; "The secular comets and the movement of the sun through space" by G. Armellini, 280–286; "The present position of the island universe theory of the spiral nebulæ" by D. B. McLaughlin, 286–295 (to be continued).

Revue générale des Sciences, volume 33, February 15, 1922: "Camille Jordan" by R. d'Adhémar, 65–66 [see *1922*, 139]—February 28: Review by M. Solovine of J. M. Child's *Early Mathematical Manuscripts of Leibniz*, 121.

Revue de Mathématiques Spéciales, volume 32, January, 1922: "Sur les conditions nécessaires et suffisantes pour que l'hyperboloïde défini par trois droites soit de révolution" by M. Chenevier, 73–76—February: "Sur les sommes des puissances semblables des nombres entiers" by M. Weber, 97–100—March: "Note sur la balance" by M. Colin, 121–123—April: "Note sur la transformation conforme" by M. Lapointe, 145–146.

Revue Scientifique, volume 59, November 12, 1921: "Le mois mathématique à l'Académie des Sciences (juillet et août 1921)" by R. Garnier, 620–621 [G. Bertrand suggests a formula that conforms to the law of Einstein for the displacement of the perihelion of a planet; E. Borel announces explicitly four fundamental hypotheses which connect the general principles of physics with those of geometry in the theory of relativity; K. Ogara gives an explanation for the element of integral around a center in the theory of gravitation of Einstein]; "La mécanique classique et la théorie de la relativité" by P. Painlevé, 621–622; "Quelques remarques sur la théorie de la relativité" by E. Picard, 622–623—Volume 60, January 14, 1922: "La durée et la conception Einsteinienne du temps" by R. Paucot, 7–17—January 28: "A propos d'un projet de Calendrier mensuel fixe" by G. Galleano, 55–56—February 11: "Camille Jordan" by R. S., 95–96 [contains the address of E. Picard at the Academy of Sciences on January 23 (see *1922*, 139)] —March 25: "L'histoire de la nomographie" by S. R., 197–198 [Extract from *Comptes Rendus de l'Académie des Sciences* for January 9, page 82.]

SCHOOL SCIENCE AND MATHEMATICS, volume 22, January, 1922: "Class exercise types in high school mathematics, with norms for judging them. II" by G. W. Myers, 7–15; "Required mathematics in the four year high school" by R. D. Shouse, 15–19—February: "Square root of a line without use of the circle" by J. B. Wood, 111–113; "An analysis of an experiment in teaching first year mathematics" by Ina E. Holroyd, 114–121; "Learning fractions" by Myrtie Collier, 121–127; "Problem department" by J. A. Nyberg, 176–180; "Annual meeting of the Central Association of Science and Mathematics Teachers" by G. Warner, 190, 192, 194—March: "The fourth dimension: An explanation the geometry class can follow " by J. V. Collins, 226-231; "The law of exponents" by R. Morris, 232–236; "New mathematical periodicals" by G. A. Miller, 276–280; "Problem department" by J. A. Nyberg, 282–284, 286.

SCIENCE, new series, volume 55, January 6, 1922: "Henry Turner Eddy" by J. J. F., 12–13 —February 10: "Subsidy funds for mathematical projects" by H. E. Slaught, 146–148—February 17: "Relativity and star diameters" by R. A. Fessenden, 180—February 24: "A mechanical analogy in the theory of equations" by D. R. Curtiss, 189–194—March 17: "Doctorates conferred in the sciences by American universities in 1921" by Callie Hull and C. J. West, 271–279.

SPHINX-ŒDIPE, volume 16, November, 1921: "Notice sur Charles Ange Laisant" (continued) by H. Brocard, 161–166; "Sur les racines primitives relatives au mod. P^n dans un corps algébrique quelconque" (concluded) by G. Métrod, 166–168; Questions and Responses, 169–176; "Divers," 176 ["M. R. C. Archibald visitera dans 6 mois des universités européennes. Meilleurs voeux en attendant sa venue parmi nous."]—December: "Notice sur Charles Ange Laisant" (concluded) by H. Brocard, 177–182; Questions and Responses, 183–189; "Table des matières de 1921;" 190–192—Volume 17, January, 1922: "Triangles et tétraèdres" by V. Thébault, 2–3; "Histoire des sciences: Correspondance de J. J. Sylvester—Ed. Lucas" translated by L. Chanzy, 4–7 (to be continued); "Solution de l'equation $4\alpha^4 - 4\alpha^3\beta + 13\alpha^2\beta^2 - 36\alpha\beta^3 + 24\beta^4 = \delta^2$" by L. Aubry, 7-10; Questions and Responses, 10–16—February: "Sur trois triangles homothétiques" by V. Thébault, 17–19; "Note sur un problème de la théorie des nombres d'Ed. Lucas" by L. Aubry, 20; Questions and Responses, 21–32.

TÔHOKU MATHEMATICAL JOURNAL, volume 20, nos. 1–2, December, 1921: "On the roots of an algebraic equation $f + k_1f' + k_2f'' + \cdots + k_nf^{(n)} = 0$" by K. Ôishi, 1–17; "Über die Gültigkeitsbedingung der Interpolationsformeln von Gauss" by M. Fujiwara, 18–21; "Sur les différences de deux ensembles fermés" by C. Kuratowski and W. Sierpínski, 22–25; "Ueber die Coefficienten in der Taylorschen Entwicklung rationaler Functionen" by C. Siegel, 26–31; "Tautochronous motion" by P. P. Upadhyaya, 32–36; "Criteria for the irreducibility of a polynomial" by K. Ôishi, 37–40; "Sur la configuration des circonférences des neuf points des triangles determinés par un groupe de points d'une même circonférence" by M. D. Montesano, 41–43 [The printers have somewhat disarranged the parts of this article. If the reader will divide the article into four nearly equal parts and read the third part before he reads the second part, he will get the correct arrangement of paragraphs as may be seen by comparison with essentially the same article printed in Italian in *Periodico di Mathematica* for January (see above).]; "Some theorems on infinite products" by C. Kien-Kwong, 44–47; "Ein Problem in der Wahrscheinlichkeitsrechnung" by M. Fujiwara, 48–50; "Über Stützgeradefunktion der konvexen geschlossenen Kurven" by M. Fujiwara, 51–59; "Sur deux théorèmes de Casey" by V. Thébault, 60–63; "On the representations of functions by the formulas of interpolation" by Y. Okada, 64–99; "On the definite integral $\int_a^\infty \varphi(t)e^{-xt}dt$" by K. Kurosu, 100–106; "On the integrals

$$\int_0^\pi \exp\left(x \begin{smallmatrix}\cos\\ \\ \sin\end{smallmatrix} p\theta\right) \begin{smallmatrix}\cos\\ \\ \sin\end{smallmatrix} q\theta d\theta\text{''}$$

by T. Hayashi, 107–114.